

# ANNUAL REPORT FOR 2000



**Cox Farm Mitigation Site**  
**Beaufort County**  
**Project No. 6.152027T**  
**SR 1712**



Prepared By:  
Natural Systems Unit & Roadside Environmental Unit  
North Carolina Department of Transportation  
December 2000

## TABLE OF CONTENTS

SUMMARY.....	1
1.0 INTRODUCTION.....	2
1.1 Project Description.....	2
1.2 Purpose .....	2
1.3 Project History.....	2
2.0 HYDROLOGY.....	4
2.1 Success Criteria.....	4
2.2 Hydrologic Description .....	4
2.3 Results of Hydrologic Monitoring.....	4
2.4 CONCLUSIONS .....	6
3.0 VEGETATION.....	9
3.1 Success Criteria .....	9
3.2 Vegetation Description.....	9
3.3 Results of Vegetative Monitoring.....	9
3.4 Conclusions.....	9
4.0 OVERALL CONCLUSIONS/ RECOMMENDATIONS.....	10

## LIST OF FIGURES

FIGURE 1 VICINITY MAP.....	3
FIGURE 2 WELL LOCATION MAP.....	5
FIGURE 3 30-70 PERCENTILE GRAPH.....	7

## LIST OF APPENDICES

APPENDIX A: DEPTH TO GROUNDWATER PLOTS.....	11
APPENDIX B: CAMA CLOSEOUT LETTER JULY, 2000.....	12

## **SUMMARY**

The following report summarizes the monitoring activities that occurred in the past year at the Cox Farm mitigation site. Monitoring activities in 2000 represent the fifth year of monitoring after construction in Winter 1996.

The Cox Farm mitigation site contains two groundwater gauges and one surface water gauge. Hydrologic monitoring in 2000 was consistent with results from previous years. The site was saturated to the surface or flooded for the majority of the growing season, exceeding the success criteria for a hydroperiod greater than or equal to 12.5% of the growing season.

The vegetation success criteria was also met in both transects with an average density of 453 trees per acre for the site.

The Cox Farm Mitigation Site achieved jurisdictional wetland hydrology while supporting a prevalence of hydrophytic vegetation.

The Department of Coastal Management has approved closing the monitoring period of the site based on the past five years of monitoring reports. (see Appendix B)

Based on the monitoring results of 2000, NCDOT recommends discontinuing the monitoring activities on the Cox Farm mitigation site and requests from the USACE written concurrence with DCM's decision.

## 1.0 INTRODUCTION

### 1.1 Project Description

The Cox Farm Mitigation Site is located in Beaufort County approximately one mile east of Leechville. The site, encompassing approximately 2 acres, is situated near the Pungo River and can be accessed by SR 1712 (Figure 1). The site is designed to create a non-riverine swamp forest community and provides mitigation for the impacts associated with the paving of SR 1712.

### 1.2 Purpose

In order to demonstrate successful mitigation, the Cox Farm site is monitored for both wetland hydrology and vegetation. The following report describes the results of the hydrologic and vegetative monitoring during the 2000 growing season at the Cox Farm Mitigation Site.

### 1.3 Project History

March, April 1996	Site planted
April 1996	Monitoring Gauges Installed
April- November 1996	Hydrologic Monitoring
May 1996	Vegetation Monitoring (1 mo.)
October 1996	Vegetation Monitoring (1 yr.)
March- November 1997	Hydrologic Monitoring
September 1997	Vegetation Monitoring (2 yr.)
March- November 1998	Hydrologic Monitoring
October 1998	Vegetation Monitoring (3 yr.)
March- November 1999	Hydrologic Monitoring
October 1999	Vegetation Monitoring (4 yr.)
March-November 2000	Hydrologic Monitoring
January 2001	Vegetation Monitoring (5 yr.)

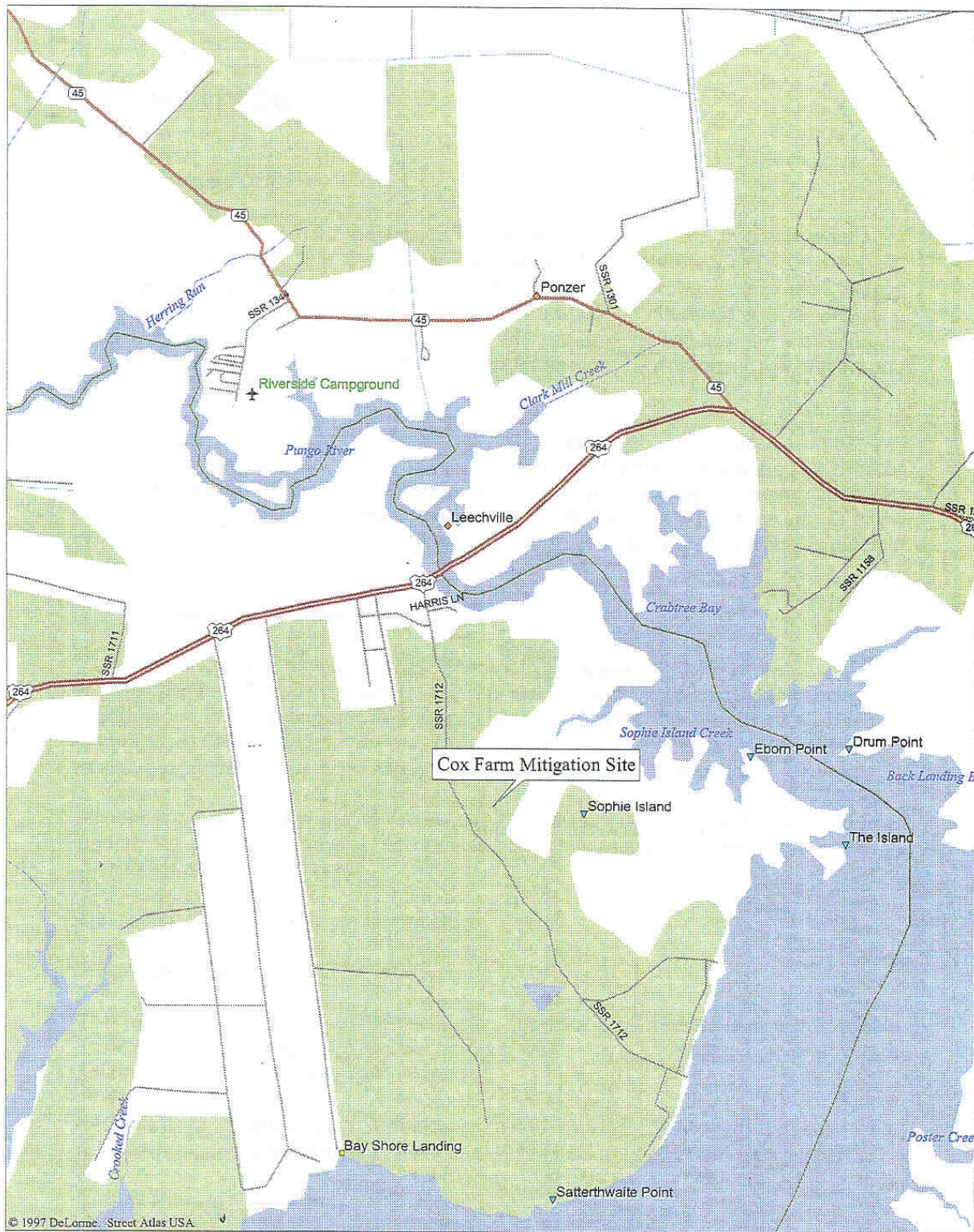


FIGURE 1 - Site Location Map



## **2.0 Hydrology**

### **2.1 Success Criteria**

In accordance with federal guidelines for wetland mitigation, the success criteria for hydrology states that the area must be inundated or saturated (within 12" of the surface) by surface or ground water for at least 12.5% of the growing season. Areas inundated less than 5% of the growing season are always classified as non-wetlands. Zones inundated between 5% - 12.5% of the growing season can be classified as wetlands based on other factors such as the presence of hydrophytic vegetation and hydric soils.

The growing season in Beaufort County begins March 13 and ends November 25. These dates correspond to a 50% probability that air temperatures will drop to 28° F or lower after March 13 and before November 25.<sup>1</sup> Thus the growing season lasts 256 days; optimum wetland hydrology requires 12.5% of the growing season, or 32 days. A hydroperiod of 8% to 12.5 % requires a minimum of 20 days. A hydroperiod of 5% to 8% requires a minimum of 13 days. The site must also experience average climatic conditions in order for the hydrologic data to be valid.

### **2.2 Hydrologic Description**

Two groundwater-monitoring gauges, one rain gauge, and one surface gauge were installed on the site in 1996 (Figure 2). The on-site rain gauge from 1999 was replaced with an Infinites tipping bucket rain gauge in Summer 2000. Daily readings are taken throughout the growing season. Rainfall data from Belhaven, provided by the State Climate Office, was utilized from January through July 2000. Data from the on-site rain gauge was used from August to December 2000. 2000 marks the fifth year of hydrologic monitoring.

Appendix A contains a plot of the water depth for each monitoring gauge and the surface gauge for the 2000-growing season. Precipitation events are included on each monitoring gauge graph as bars.

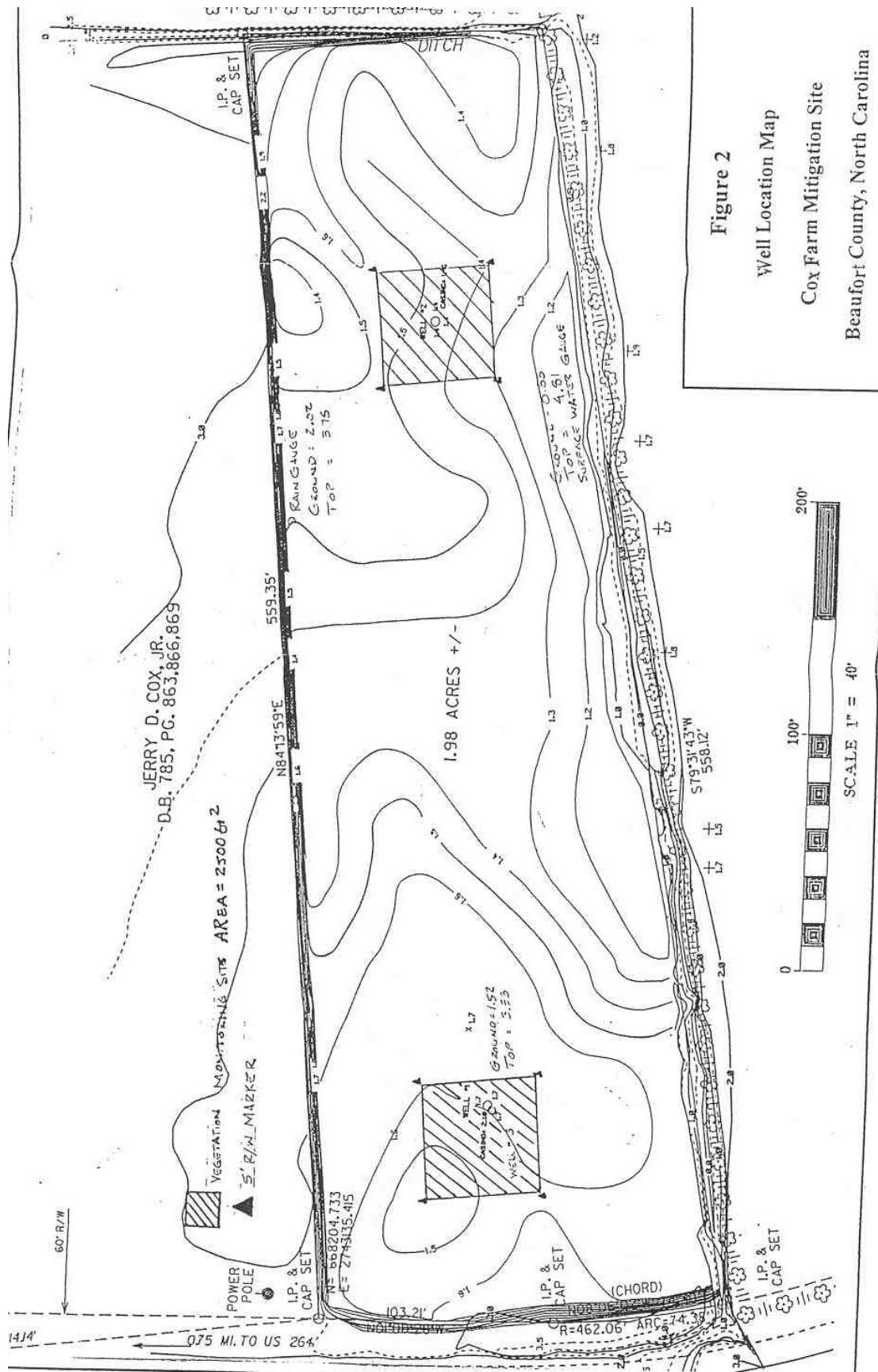
### **2.3 Results of Hydrologic Monitoring**

#### *2.3.1 Site Data*

The maximum number of consecutive days that the groundwater was within twelve inches of the surface was determined for each gauge. This number was converted into a percentage of the 256-day growing season.

---

<sup>1</sup> Soil Conservation Service, Soil Survey of Beaufort County, North Carolina, p.93.



Because of the natural variability of wetland systems, the groundwater monitoring results are presented as a series of percentage ranges. Table 1 presents the percentage range, the actual percentages, and dates of the longest hydroperiod for each gauge.

TABLE 1  
2000 HYDROLOGIC MONITORING RESULTS

Monitoring Gauge	< 5%	5% - 8%	8% - 12.5%	> 12.5%	Actual %	Success Dates
CX-1			✓		9.4	Mar 13 – Apr 7
CX-2			✓		9.4	Mar 13 – Apr 7

Both groundwater gauges showed hydroperiods greater than 8% of the growing season. Furthermore, the groundwater plots illustrate an extended hydroperiod from March 13 through May 7, except for a few days in early April. This period accounts for approximately 19% of the growing season.

The surface water gauge supports the results of the groundwater gauges, indicating a presence of surface water throughout much of the growing season.

### 2.3.2 Climatic Data

Figure 3 represents an examination of the local climate in comparison with historical data to determine if the monthly rainfall totals are within the normal range for the area. The historical data from Belhaven was provided by the National Climatic Data Center. The recent rainfall data from Belhaven was provided by the State Climate Office at NC State University for the period from January through July 2000. An on-site Infinities gauge recorded rainfall data from August through November 2000.

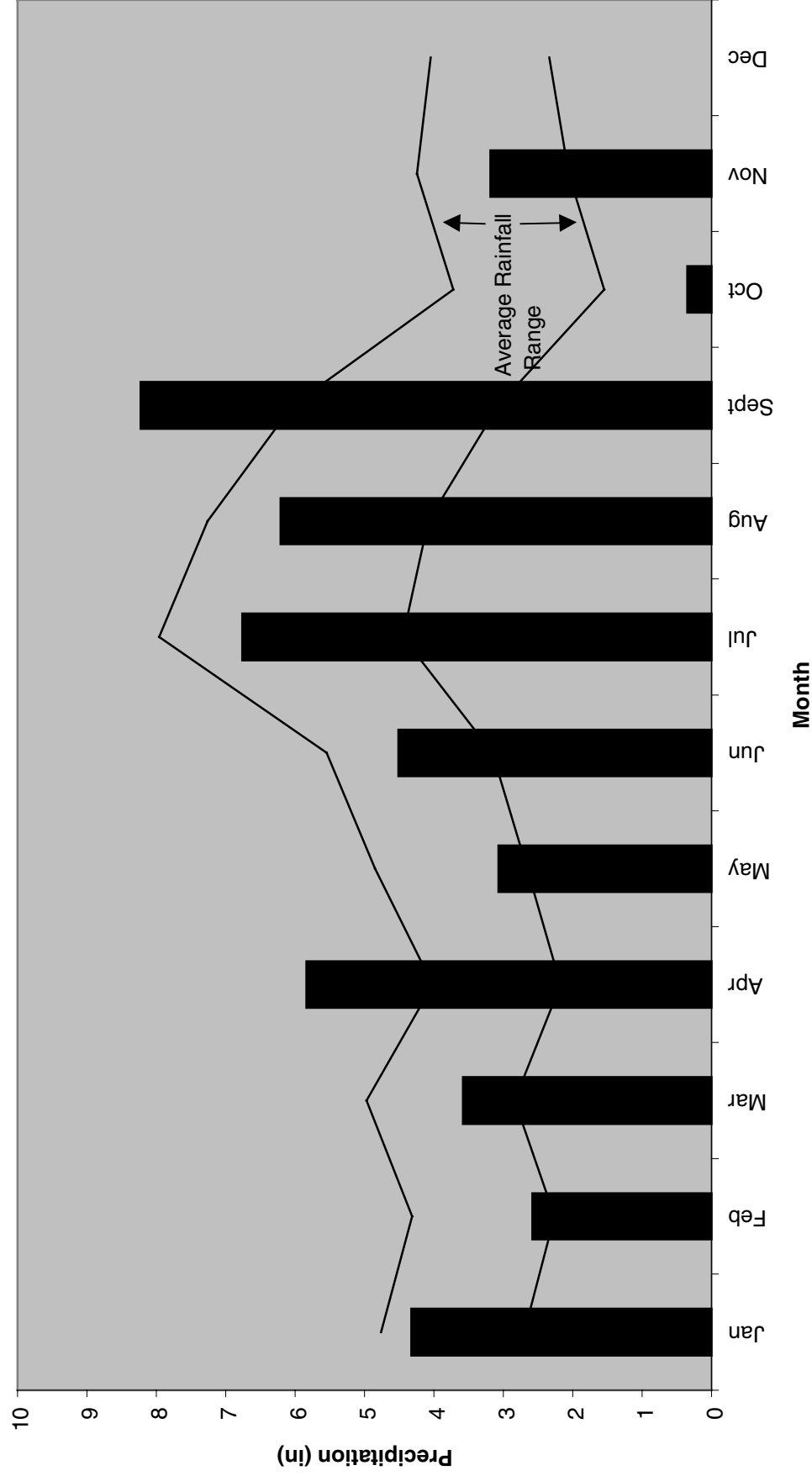
Monthly rainfall totals were in the low normal range for most of the early growing season. Only the months of April and September were above normal. Overall, rainfall on the site fell within the normal range for most of the growing season.

## 2.4 Conclusions

The hydrologic monitoring results for 2000 were consistent with results from previous years. The site was inundated or saturated within 12 inches of the soil surface for a substantial portion of the growing season under normal rainfall conditions



**Cox Farm 30 - 70 Percentile Graph  
Belhaven, NC**



### 3.0 VEGETATION: COX FARM MITIGATION SITE

#### 3.1 Success Criteria

Success Criteria states that there must be a minimum of 320 trees per acre living for at least three consecutive years.

#### 3.2 Description of Species

The following species were replanted in the Wetland Restoration Area:

Juncus effusus, common rush

Taxodium distichum, bald cypress

Nyssa biflora, swamp tupelo

Quercus phellos, willow oak

Quercus nigra, water oak

Liriodendrum tulipifera, tulip poplar

#### 3.3 Results of Vegetation Monitoring

Plot #	Tupelo Gum	Bald Cypress	Total (3 year)	Total (at planting)	Density (Tree/Acre)
1	2	19	21	36	397
2	3	24	27	36	510
AVERAGE DENSITY					453

**Site Notes:** Plot #1 contained juncus, baccharis, pine, black willow, broom sedge and standing water. Plot #2 contained juncus baccharis and black willow.

#### 3.4 Conclusions

There are approximately two acres of wetland mitigation on this site. Two vegetation monitoring plots were established throughout the planting areas. The vegetation monitoring revealed an average density of 453 trees per acre, which is well above the 320 trees per acre minimum success criteria.

## **4.0 OVERALL CONCLUSIONS/ RECOMMENDATIONS**

After five years of monitoring, the Cox Farm Mitigation Site has met wetland criteria for both hydrology and vegetation. The site achieved jurisdictional wetland hydrology while supporting a prevalence of hydrophytic vegetation.

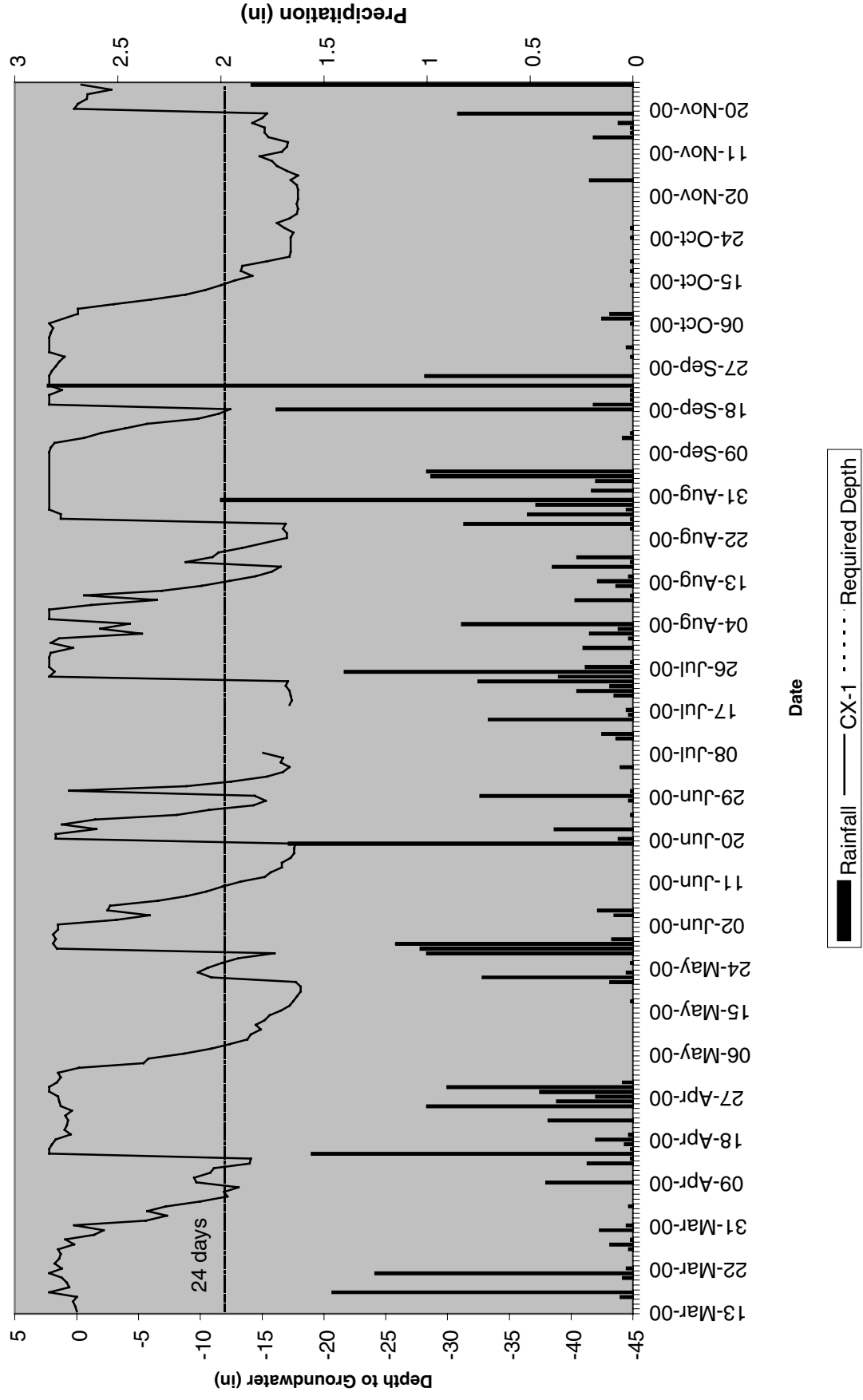
The Department of Coastal Management has provided to the Department stating that the site has met the mitigation success criterion. (see Appendix B)

NCDOT would recommend discontinuing any monitoring of the site and requests written concurrence from the USACE and DWQ on this matter.

## **APPENDIX A**

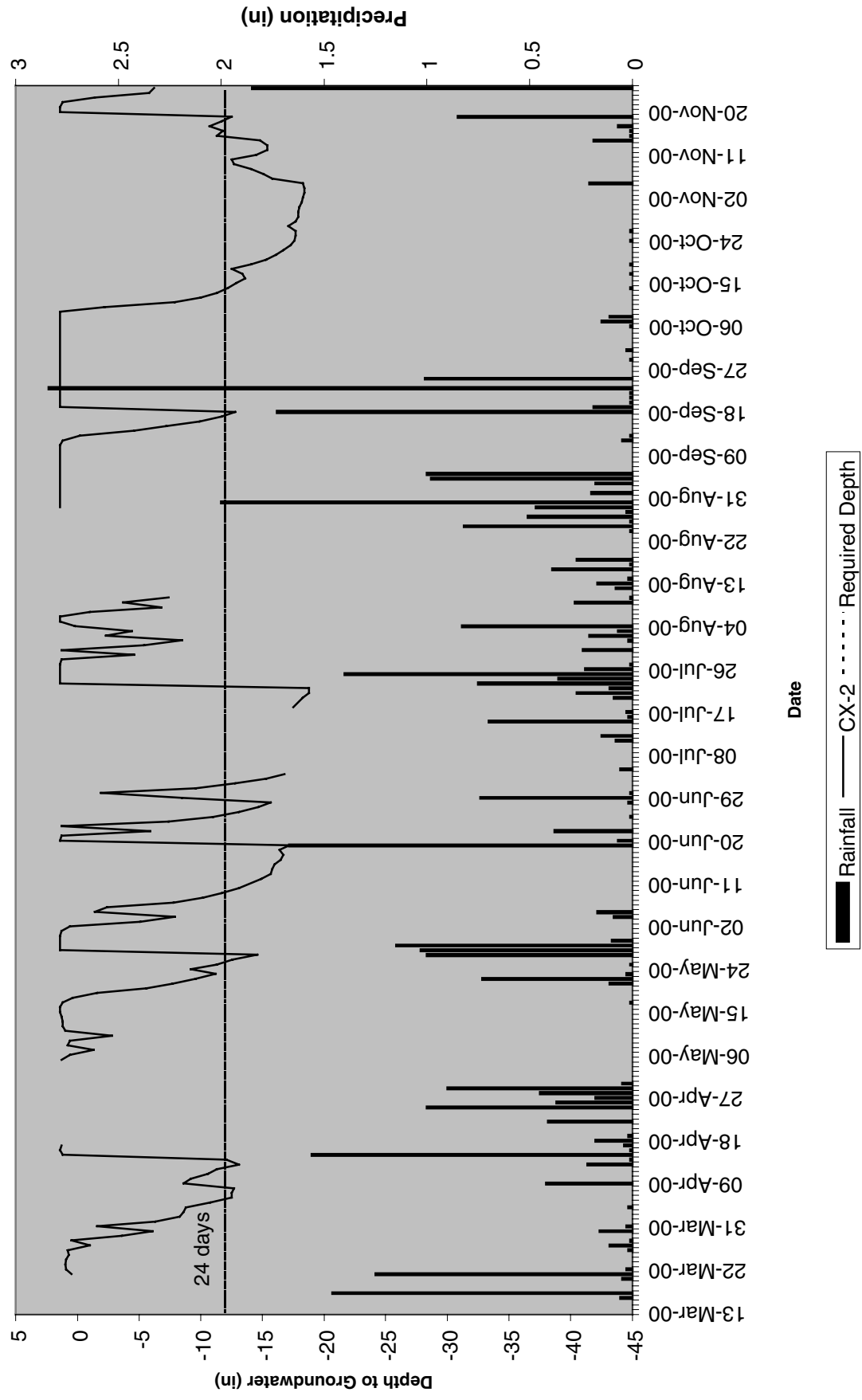
### **Depth to Groundwater Plots**

# Cox Farms CX-1

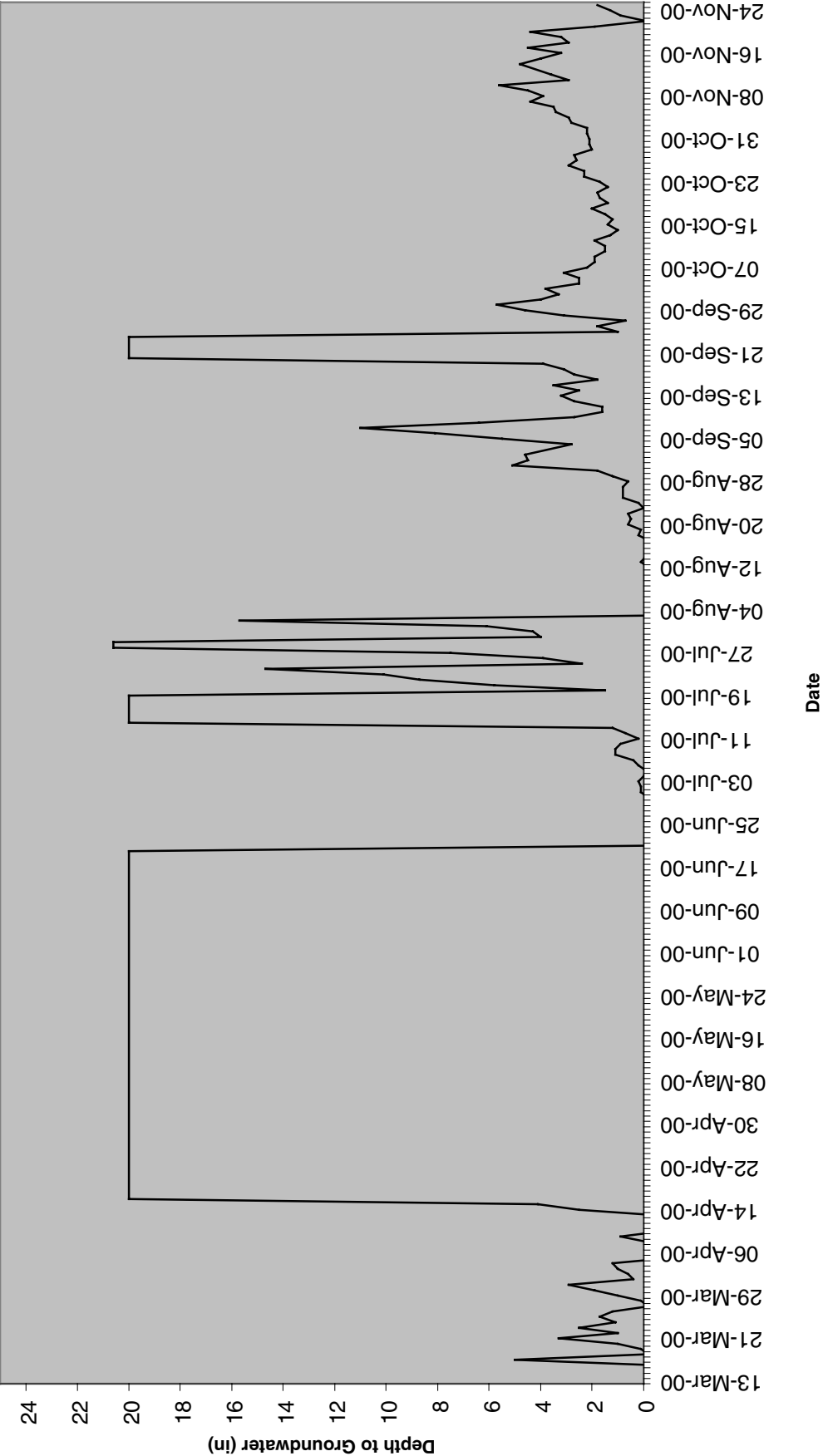




# Cox Farms CX-2



Cox Farms Surface Gauge CX-3



## **APPENDIX B**

### **CAMA Closeout Letter**



JAMES B. HUNT JR.  
GOVERNOR

BILL HOLMAN  
SECRETARY

DONNA D. MOFFITT  
DIRECTOR

NORTH CAROLINA DEPARTMENT OF  
ENVIRONMENT AND NATURAL RESOURCES  
DIVISION OF COASTAL MANAGEMENT

August 3, 2000

V. Charles Bruton, Ph.D.  
Assistant Branch Manager  
Project Development and Environmental Analysis  
NC Department of Transportation  
1548 Mail Service Center  
Raleigh, N.C. 27699-1548

Dr. Bruton:

This letter is in response to your letter dated May 9, 2000 regarding the regulatory release of the Cox Farm Mitigation Site associated with CAMA Permit number 105-93. It appears, according to the site description in your letter and in the 1999 annual monitoring report, that the vegetation and hydrologic success criteria have been met. Based on this and a recent report from Mike Bell that the fill material placed on the site by an adjacent landowner had indeed been removed, we agree with your recommendation to discontinue monitoring at this site. We are pleased that the site has exceeded the success criteria.

Thank you for allowing DCM to comment on this project. If you have any questions, please call Cathy Brittingham or Kelly Williams at 733-2293.

Sincerely,

Doug Huggett  
CAMA Permit Coordinator

cc:

Cathy Brittingham, NCDCM  
Kelly Williams, NCDCM  
Randy Griffin, NCDOT ✓



MAILING: 1638 MAIL SERVICE CENTER, RALEIGH, NORTH CAROLINA 27699-1638

PHYSICAL: 2728 CAPITAL BLVD., RALEIGH, NC 27604

PHONE: 919-733-2293 FAX: 919-733-1495

AN EQUAL OPPORTUNITY / AFFIRMATIVE ACTION EMPLOYER - 50% RECYCLED / 10% POST-CONSUMER PAPER

DENR TOLL FREE HOTLINE: 1-877-623-6748